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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/857,116  | 08/09/2001  | Peter Geoffrey Gray  | JMYT-245US          | 9674             |
| 23122   | 7590        | 06/17/2004           | EXAMINER            |                  |
| RATNERPRESTIA<br>P O BOX 980<br>VALLEY FORGE, PA 19482-0980 |             |                      | DUONG, THANH P      |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |

1764

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/857,116

Applicant(s)

GRAY ET AL.

Examiner

Tom P Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 12-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 08/09/2001.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-11, drawn to a catalytic selective oxidation reactor, classified in class 422, subclass 173.
- II. Claims 12-14, drawn to a process for removal of quantities of CO from hydrogen feedstock, classified in class 48, subclass 197R.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the process for removal of quantities of CO from a hydrogen feedstock can be done either by pressure swing absorber (PSA), amine leaching process, or separation membrane other than catalytic selective oxidation.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

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Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Christian Bauer on May 12, 2004 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-11. Affirmation of this election must be made by applicant in replying to this Office action. Claims 12-14 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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1. Claims 1 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Trocciola et al. (5,330,727). Regarding claims 1 and 8, Trocciola et al. discloses a catalytic selective oxidation reactor, comprising a cylindrical reactor vessel (10) with counter-current cooling means (25, 35) and at least one stage (first stage 20, second stage 30), each stage being provided with an inlet for a first feedstock (11), and inlet for a second feedstock (O<sub>2</sub>/Air), gas mixing means (23, 33) and a catalytic reaction zone (22,32), wherein the reaction zone comprises a selective catalyst (22,32) deposited upon a metal support (23,33).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 4-5, and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 2,075, 859 (GB '859) in view of Heisel (4,988,431) and Cook (5,113,844). Regarding claims 1 and 8-9, GB '859 discloses a catalytic selective oxidation reactor, comprising a cylindrical reactor vessel (Fig. 2) with cooling means (via water downcomer 36) and at least one stage (Page 4, lines 7-10), each stage being provided with an inlet (22) for a first feedstock (2), and inlet for a second feedstock (22), gas mixing means (vertical fins, Col. 4, lines 28-30) and a catalytic reaction zone (24).

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GB '859 fails to disclose "counter-current" cooling means. Heisel teaches the heat released from the exothermic reaction is removed by a heat exchange coils 18 with counter current flow. Cook makes it clear the heat exchange with counter-current flow is more efficient than heat exchange with co-current flow (Col. 1, lines 18-31). Thus, it would have been obvious in view of Heisel and Cook to one having ordinary skill in the art to modify the reactor of GB '859 with heat exchange having counter-current means as taught by Heisel and Cook in order to improve efficient of the heat exchanger.

Regarding claims 1 and 2, GB '859 shows the metal support (25) is mounted in heat exchange contact with cooling means (36, 38). Regarding claim 4, GB '859 shows the cooling means comprises a central jacket (36,38) mounted within a reactor (Fig. 2).

Regarding claim 5, GB '859 shows the central jacket (45A) is connected to the coolant (via line thru boiler feed water) to an external heat exchanger (47). Regarding claim 7, GB '859 shows the catalytic reaction zones (24) are annular and surround the cooling means (36,38). Regarding claim 10, GB '859 discloses the gas mixing means comprises annular mixing vanes or discs (vertical fins, Col. 3, lines 25-34), which facilitates mixing of the gases and transfers gases from one stage to subsequent stage.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over applied references (GB '859 in view of Heisel '431 and Cook '844) as applied in claim 1 above and further in view Madgavkar et al. (4,186,801). GB '859 discloses the metal support (catalyst grids 25) but the applied references fails to disclose the metal support is a "metal monolith." Madgavkar teaches oxidation catalyst is carried on by an inert

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support structure such as a honeycomb monolith carrier and such structure provides the benefits of supporting the catalyst and minimizes the pressure drop across the bed (Col. 5, lines 35-54). Thus, it would have been obvious in view of Madgavkar to one having ordinary skill in the art to modify the catalytic reactor of the applied references with a catalyst of honeycomb monolith carrier as taught by Madgavkar in order to gain the above benefits.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over applied references (GB '859 in view of Heisel '431 and Cook '844) as applied in claim 4 above and further in view Fleckenstein et al. (4,942,266). Regarding claim 6, GB '859 shows a central jacket connected to a cooling circuit to an external heat exchanger but fails to show a circulation pump. Fleckenstein teaches a pump 15 is arranged in the coolant circuit 13 and such pump facilitates the transferring of coolant from the heat exchanger to the reactor. Thus, it would have been obvious in view of Fleckenstein to one having ordinary skill in the art to modify the cooling circuit of applied references (GB '859) with a circulation pump as taught by Fleckenstein in order to facilitate the transferring of the coolant from heat exchanger to the reactor so that the reaction temperature in the catalyst bed can be controlled properly.

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over applied references (GB '859 in view of Heisel '431 and Cook '844) as applied in claim 1 above and further in view Aoyama (5,843,195). The applied references fail to disclose the

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output from a reformer such that CO is removed from the output gas to a level where the output from the reactor may be fed to a fuel cell. Aoyama teaches the output reforming gas from the reformer 30 (Fig. 1) is fed to the CO selective oxidizing unit 34 to reduce the CO concentration and the reforming fuel (rich-hydrogen) is fed to the fuel cells 20 (Col. 9, lines 57-62) to provide electrical energy. Thus, it would have been obvious in view of Aoyama to one having ordinary skill in the art to modify the catalytic reactor of the applied references with a reformer connected upstream of the catalytic reactor to convert hydrocarbon gas to reforming gas to be used in the fuel cell.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom P Duong whose telephone number is (571) 272-2794. The examiner can normally be reached on 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

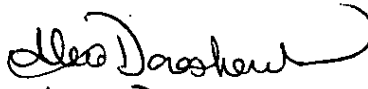


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Duong  
May 25, 2004

TD

  
Alexa Dorashenk  
Patent Examiner  
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